and no statin use (HR, 3.41; $P = .006$) at baseline. The rate of stroke referable to contralateral progression was 5.6% (6 of 107).

Conclusions: Restenosis and contralateral carotid stenosis after CEA progress significantly after 5 years, with possible impact on surveillance strategies. Restenosis was not associated with closure technique. Statin use reduces new symptoms but not the rate of disease progression.

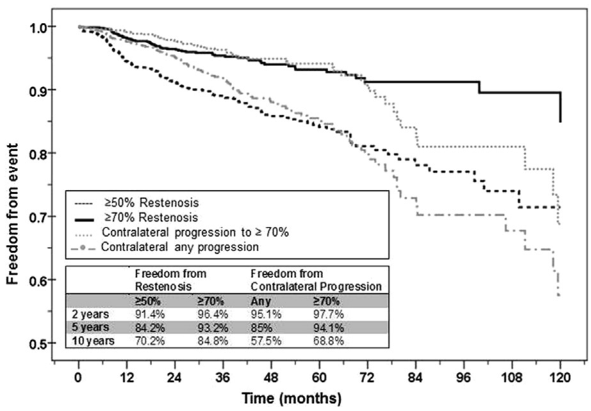

Fig. Freedom from restenosis and contralateral progression of ICA stenosis following CEA.

Practice Patterns of Carotid Endarterectomy as Performed by Different Surgical Specialties and the Impact on Perioperative Stroke and Cost

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Objectives: Carotid endarterectomy (CEA) is currently performed by various surgical specialties with varying outcomes. This study analyzes different surgical practice patterns and their impact on perioperative stroke and cost.

Methods: This is a retrospective analysis of prospectively collected data of 1000 consecutive CEAs performed at our institution by three different specialties: general surgeons (GS), cardiothoracic surgeons (CT), and vascular surgeons (VS).

Results: A total of 474 CEAs were done by VS, 404 by CT, and 122 by GS.VS tended to operate more often on symptomatic patients than CT and GS: 40% vs 23% and 31%, respectively ($P < .0001$). Preoperative workups were significantly different between specialties: duplex ultrasound (DUS) only in 66%, 30%, and 18%; DUS and CTA in 27%, 35%, and 29%; DUS and MRA in 6%, 35%, and 52% for VS, CT, and GS, respectively ($P < .001$). The mean preoperative carotid stenosis was not significantly different between the specialties. The mean heparin dosage was 5168, 7522, and 5331 units ($P = .0001$), and protamine was used in 0.2%, 19%, and 8% ($P < .0001$) for VS, CT, and GS, respectively. Postoperative drains were used more often by VS; however, there was no association between heparin dosage, protamine, and drain use and postoperative bleeding. Patching was used in 99%, 93%, and 76% ($P < .0001$) for VS, CT, and GS. Bovine pericardial patches were used more often by CT, and ACUSEAL (Gore) patches were used more often by VS ($P < .0001$). The perioperative stroke/death rates were 1.27% for VS and 3.04% for CT and GS combined ($P = .055$); and for asymptomatic patients, 0.7% for VS and 3.02% for CT and GS combined ($P < .034$). Perioperative stroke rates for patients who had preoperative DUS only were 0.88% vs 3.29% for patients who had extra imaging (computed tomography/magnetic resonance angiography; $P = .009$); and for asymptomatic patients, it was 0.94% vs 3.01% ($P = .05$). When applying hospital billing charges for preoperative imaging workups (cost of DUS only vs DUS and other imaging), the VS practice pattern would have saved $1180 per CEA over CT and GS practice patterns; a total savings of $1,180,000 in this series.

Conclusions: CEA practice patterns differ between specialties. Although the cost was higher for non-VS practices, the perioperative stroke/death rate was somewhat higher. Therefore, educating physicians who perform CEAs on cost-saving measures may be appropriate.

A Propensity Score Matched Analysis of Asymptomatic Patients Undergoing Carotid Endarterectomy (CEA) vs Coronary Artery Bypass Graft (CABG) vs Combined CEA-CABG in the ACS-NSQIP

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Objectives: Carotid endarterectomy (CEA) and coronary artery bypass grafting (CABG) may be combined to treat concomitant coronary artery and carotid artery atherosclerotic disease. Previous reports on combined CEA/CABG have shown wide variation in adverse event rates for asymptomatic patients and have often been limited by small sample size or lack of granularity, or both. We aim to compare stroke and death after CEA/CABG with CEA or CABG alone in asymptomatic patients by using the American College of Surgeons (ACS) National Surgical Quality Improvement Program (NSQIP) database.

Methods: All patients undergoing CEA, CABG, or CEA/CABG from 2005 to 2011 in the NSQIP database were identified. NSQIP-documented neurologic symptoms lack laterality and temporal detail for assignment of positive current neurologic symptoms, whereas asymptomatic patients are captured with excellent accuracy. Accordingly, only asymptomatic patients were analyzed. Propensity score matched groups of asymptomatic patients were based on age, sex, and American Society of Anesthesiologists class 4. Analysis of variance, χ^2, and multivariable logistic regression were used to compare stroke, death, and combined stroke/death across procedures.

Results: We identified 47,667 patients: 42,474 CEA (89%), 5018 CABG (11%), and 175 CEA/CABG (<1%). Forty percent of all patients had a history of neurologic symptoms and were omitted from consideration: 43% CEA, 12% CABG, and 28% CEA-CABG. Unmatched rates of stroke/death in asymptomatic patients were 1.4% (CEA), 3.3% (CABG), and 6.7% (CEA/CABG). Propensity score matching identified 1332 asymptomatic patients: 606 CEA, 607 CABG, and 119 CEA/CABG. Stroke, death, and stroke/death rates are compared across procedures in the Table. Independent risk factors for stroke/death among matched asymptomatic patients were recent myocardial infarction (odds ratio [OR], 4.0; 95% confidence interval [CI], 2.0-8.0), COPD (OR, 4.7l; 95% CI, 2.4-9.2), and age >70 years (OR, 2.7; 95% CI, 1.4-5.2). CEA/CABG compared with CABG alone did not have increased risk of stroke/death (OR, 6; 95% CI, 0.2-1.4). No significant difference was seen between the stroke/death rate of CEA/CABG (6.7%) compared with the aggregate of CEA and CABG alone (2.1% + 4.2%).

Conclusions: In asymptomatic patients, CEA/CABG does not confer an increased risk for stroke/death compared with the combined risk of CEA and CABG alone. CEA/CABG should be considered a safe approach in asymptomatic patients requiring CEA and CABG.

Table. Propensity score matched group outcome comparison

Variable	*CEA* (*n* = 606)	*CABG* (*n* = 607)	*CEA-CABG* (*n* = 119)	P (*CABG vs CEA/CABG*)
Death, %	1.2	2.3	3.4	.516
Stroke, %	1.2	2.0	3.4	.314
Stroke/death, %	2.1	4.1	6.7	.227

Axillary-Axillary Arteriovenous PTFE Grafts for Hemodialysis in Difficult Patients

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Objectives: Long-term hemodialysis patients are a difficult patient population because they have few remaining access options and may have disadvantaged vasculature in the upper extremities. Because of the increased infection rate with femoral access, surgeons may place an axillary artery-to-axillary vein arteriovenous graft (AAAVg). Few outcome reports of this technique exist. In this study, which is the largest reported to date, we investigate the results of the AAAVg configuration.

Methods: At our institution, an AAAVg is a polytetrafluoroethylene (PTFE) graft in a loop configuration in the upper chest with anastomoses to the axillary artery and ipsilateral axillary vein. After Investigational Review